

such as comparison with known data values or other suitable procedures. If no detectable errors are found **208** the data may be accepted and transferred or further processed according to the requirements of an associated application. In the event a data error is detected **210**, receiver error correction steps may be implemented. In preferred embodiments of the invention, one or more of the above-mentioned oversampling techniques is used until data with acceptable integrity is obtained. Additional and alternative sampling techniques may also be used including but not limited to retransmission of data. Additional data received **204** is evaluated **206** in a similar manner and either accepted **208** or rejected as steps to adapt the sampling **210** to prevailing conditions are reiterated.

[0027] In a further example on the transmission side, the signal strength may be adaptively adjusted as needed. For example, in the event the coils become misaligned, imperfectly oriented, or their separation distance increases, the signal strength at the receiver tends to degrade. In this case, the transmit side of the system preferably increases its transmission signal strength as required, for example by increasing the drive voltage. Alternatively, or additionally, if the signal strength becomes degraded, the system may transmit using a different transmission frequency. Using a slower transmission rate may improve the signal integrity. The transmission rate may subsequently be increased in the event conditions improve.

[0028] FIG. 3 is a diagram depicting an algorithm **300** for adjusting transmission strength and/or frequency in accordance with an exemplary embodiment of the invention. The algorithm **300** may be implemented using a computer, signal processing platform, or other programmable device. Data is transmitted **302** by a suitable transmitter and is received as a data signal for processing **304**. In an error detection step **306**, the data signal is checked for the presence of errors. Error checking may include techniques such as comparison with known data values or other suitable procedures. If no detectable errors are found **308** the data may be accepted and transferred or further processed according to the requirements of an associated application. In the event a data error is detected **310**, one or more transmission error correction steps may be implemented. In preferred embodiments of the invention, the data signal frequency and/or amplitude may be adjusted and subsequent received data evaluated **306** until an acceptable data signal is obtained. Transmitter error correction algorithms, of which this is an example, may be implemented independently or in combination with receiver error correction algorithms.

[0029] In an example of an error correction technique, the detection of inverted and non-inverted received data may be used as an indicator of inductor alignment or misalignment. In the event the receive coil is outside of the transmit coil, the received data appears to be inverted. If the receiver is anticipating a specific pattern, the inverted data results in the receiver failing to recognize the incoming data. Preferably, the system monitors both the inverted and non-inverted data stream and corrects for coil misalignment based on the comparison. At this point, either the receiver or the transmitter can modify the data stream to restore data integrity.

[0030] FIG. 4 is a diagram illustrating an algorithm for comparing received data in accordance with an example of a preferred embodiment of the invention. This algorithm **400** may be implemented using a computer, signal processing platform, or other programmable device. Data is transmitted **402** by a suitable transmitter and is received as a data signal

for processing **404**. In addition, the data signal may be manipulated to produce an inverted version of the data **406**. The data may be checked for the presence of errors by making a comparison **408** of the received data with the inverted data. If no errors are detected **410** the data may be accepted and transferred or further processed according to the requirements of an associated application. In the event a data error is detected, receiver error correction steps may be implemented **412**. Additionally, transmitter error correction steps may also be taken **414**.

[0031] While the making and using of various exemplary embodiments of the invention are discussed herein, it should be appreciated that the present invention provides inventive concepts which can be embodied in a wide variety of specific contexts. It should be understood that the invention may be practiced with power transfer functionality, such as in battery chargers and AC/DC converters. For purposes of clarity, detailed descriptions of functions, components, and systems familiar to those skilled in the applicable arts are not included. The methods and apparatus of the invention provide one or more advantages including but not limited to, data transfer capabilities, managed power transfer capabilities, and improved converter and charging systems with enhanced energy utilization and conservation attributes. While the invention has been described with reference to certain illustrative embodiments, those described herein are not intended to be construed in a limiting sense. For example, variations or combinations of steps or materials in the embodiments shown and described may be used in particular cases without departure from the invention. Various modifications and combinations of the illustrative embodiments as well as other advantages and embodiments of the invention will be apparent to persons skilled in the arts upon reference to the drawings, description, and claims.

We claim:

1. A data transmission system comprising:

a transmitter having a transmitter inductor configured for wirelessly coupling with;

a receiver having a receiver inductor, wherein data transmitted from the transmitter inductor may be received as a data signal by the receiver inductor;

an error detector for identifying the presence of data error in the data signal, wherein the error detector is configured to perform one or more of, a receiver error correction algorithm, and a transmitter error correction algorithm.

2. The system according to claim 1 wherein the receiver is configured to increase and decrease sample size in response to the receiver error correction algorithm.

3. The system according to claim 1 wherein the receiver is configured to increase and decrease sample points in response to the receiver error correction algorithm.

4. The system according to claim 1 wherein the receiver is configured to shift sampling in response to the receiver error correction algorithm.

5. The system according to claim 1 wherein the transmitter inductor is configured to increase and decrease the transmission power in response to the transmitter error correction algorithm.

6. The system according to claim 1 wherein the transmitter inductor is configured to increase and decrease the transmission frequency in response to the transmitter error correction algorithm.